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ABSTRACT

The project on which this document reports intends to (1) implement a three-year and a four-year sequential curriculum based upon developmental concepts, (2) change the traditional roles of the teacher and the student, (3) accommodate individual differences in children's levels and learning rates, (4) involve parents in the education and cognitive development of their children, (5) use teacher assistants to free teachers for small group activity, and (6) carry out an extensive evaluation of the children in this program and compare them with control groups. The sequential curriculum is the Learning to Learn Program and the subjects are 44 4-year-olds and 42 5-year-olds . The experimental groups were exposed to the Learning to Learn Program, while the control groups entered a traditional preschool or kindergarten. At the end of the first year of the project, extensive developmental evaluation indicates larger gains for the experimental groups, especially among the 4-year-olds. Long range plans call for a continuation of the experimental and control conditions, accompanied by further testing, through the second grade. (MH)

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Grant Report

for Grant No. OEO CG-8222A/0

Submitted to the Office of Economic Opportunity
Project Head Start
Division of Research and Evaluation

Project Title: A Sequential Approach to Early Childhood and Elementary Education, Phase I

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Introduction and Objectives

In a recent report entitled The Changing School Curriculum, Goodlad (1966) describes the various curriculum projects that have been developed or are being researched to improve the quality of education in our nation's schools. In his summary, he states that encouragement should be given to projects designed to develop curriculum from the bottom up (working from the early school years to the later ones) instead of the current procedure which is to work from the top down. However, in the search for the "bottom," curriculum planners do not appear to be considering early childhood as a starting point for this process of change. Only one passing comment in Goodlad's 120 page report acknowledges the existence of early childhood education. This is surprising in view of the current evidence that early childhood is the most important period in the development of the child's ability to think, reason and learn (Bloom, 1964; Bruner, 1966; Heywood, in press; Hunt, 1961). This has led to the necessity of developing a new and innovative solution to the educational problems presented in early childhood.

Therefore, at the outset, this program is innovative in its focus of applying principles of learning and cognitive development to early childhood education. This program is a sequential one which in a step-by-step manner takes the child through the various motor, perceptual, and symbolic developmental stages.

The purpose of this demonstration project was to implement the sequential learning program with four- and five-year-old children.

The long term plan is for these children to be kept in a continuous sequential program through the second grade. The project has two separate aspects. One is the demonstration project of the Learning to Learn Program. The second is the evaluation and follow-up of this project. The purpose of the evaluation study is (1) to compare and contrast the development of the children who begin their preschool program at the age of four and have had two preschool years in the Learning to Learn Program (Group 4E) with those who begin at five years of age and have had a one year preschool program (Group 5E); (2) to compare and contrast the development of the experimental children with control groups (Groups 4C and 5C) who were matched with the experimental children in intelligence, language ability, perceptual-motor ability, and socio-economic status; (3) to compare and contrast the development of the children in this project with those from two previous research projects with the Learning to Learn Program. The fulfillment of these purposes is contingent upon the extension of this project for three years beyond the first 18 months covered in this report.

Objectives of the demonstration program

The objectives of the demonstration program are as follows:

1. to implement a three year and a four year continuous sequential curriculum based upon concepts and structures which have been identified as basic to the cognitive development of young children.

2. to change the traditional role and function of the teacher as demonstrated by:
   a. change from lecturer and instructor to evaluator
   b. change from expository teaching to teaching through inquiry and exploration
3. to change the traditional role and function of the pupil in the following ways:
   a. greater development in cognitive control; i.e., attention, concentration, delay before responding, reflection, etc.
   b. more persistence and effort on achievement tasks
   c. greater skill in developing strategies to solve problems and in making decisions
   d. more balanced development of academic, recreative and social skills
4. to accommodate individual differences in the rate and level of learning by using small group and individual learning situations
5. to involve parents in the education and cognitive development of their children by pointing out specific methods, techniques and activities which should be used at home to develop the learning process
6. to provide an opportunity for the teacher to work with small groups and individual students by using teacher assistants

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Objectives of the evaluation program

The purpose of the evaluation and follow-up study is to determine the differential development of the four groups of children. For the

present study it was hypothesized that the children participating in the Learning to Learn Program would be developmentally superior to the control children as measured by a wide variety of developmental measures. It was further hypothesized that in following these children through the second grade:

1. Group 4E would be developmentally superior to Group 5E at the end of the Learning to Learn Preschool Program and also after each group has completed the first and second grades.

2. Group 4E would be developmentally superior to Group 4C at the end of each year of the preschool program, the first grade, and the second grade.

3. Group 5E would be developmentally superior to Group 5C at the end of the preschool program, the first grade, and second grade.

Description of the Learning to Learn Program

The Theoretical Basis of the Program

The Learning to Learn Program was conceived and developed on the premise that the primary objective of early childhood education is to help the child learn to learn. This premise leads to the following seven basic principles underlying the Learning to Learn Program:

(1) The child must be an active participant in the acquisition of knowledge and be given a major share of the work in the learning situation. The child is not considered to be a passive data bank that is filled by a highly verbal teacher who "teaches" the child all he knows.

(2) The child must receive feedback that the application of his knowledge has made a contribution to himself and someone else. Such a realization builds self-confidence and self-worth.

(3) The internal satisfaction and feelings of adequacy that develop from the knowledge that he can cope with and master his environment stimulate the child's growth toward independence and achievement.

(4) Learning becomes more meaningful to the child when it is in the form of a problem which challenges him and sparks his curiosity. The emphasis is placed on the process of problem solving and not on the accuracy of the solution. Such an approach encourages decision making and the development of flexible cognitive sets and strategies for learning without fear of failure and disapproval.

(5) The verbal symbols, concepts, skills and attitudes learned will more readily become a part of the permanent repertoire of intelligent behavior if they are immediately useful and helpful in the child's everyday world.

(6) The child must be exposed to opportunities for the interaction of multiple sensory and motor activities and the accurate labeling and communication of the information received. The child is usually fascinated with the realization that he can internalize an external process, organize it, and then report it to a listener who understands the logic of his thoughts. This is especially intriguing when the data processed are from sources other than the eyes and ears.

(7) Learning experiences for the child take on value not in mere exposure but in their timing, continuity, and the ways they are structured. Appropriate timing and sequencing of experiences regulate the amount and intensity of stimulation, provide an atmosphere that lends itself to attention, concentration, and greater sensitivity to the structure of the experiences. This approach assures that the child is moving forward by providing a hierarchical structure of learning experiences.

These seven principles have been shaped by a knowledge of child development, education, learning, and by daily observations of teachers' and children's behavior and their interaction during the three year experimental use of the Learning to Learn Program.

The organization of the Learning to Learn Program was built on the assumption that cognitive growth and development proceed in an

orderly sequence with periods of transition. It was assumed, on the basis of past research, that the sequence proceeds from motor to perceptual to symbolic aspects of cognitive functioning. In the motor stage the child's first cognitive working concern is in manipulating the world through actions. By establishing a relationship between experience and action, the child becomes aware of certain surface features by which he can identify the objects with which he works and the world around him. Through his perception of the world around him he learns the relationships between the various things he observes. He must be given the opportunity to perceive, recognize, categorize, and discover relationships. This leads to the stage of symbolic formation which enables the child to talk about and deal with things and ideas in the abstract, or in the absence of any tangible objects or relationships. With the acquisition of the ability to communicate verbally comes the capacity to recall the past, represent the present, and to think about the future and the "possible." Language becomes a vitally important tool for thinking, reasoning, and communicating things that the child has not said or heard before.

With the establishment of the program within a theoretical framework, the next essential step toward putting the theory to work was to determine where most four- or five-year-olds are with respect to their development. Psychological and educational literature provided quite clear evidence in this regard. A more challenging step was the necessity for translating theory and research into practical content which would facilitate a child's progress through the developmental sequence.

The natural choice for something to motivate, stimulate, and appeal to children was the use of games or a game atmosphere. The games employed in this program were constructed around five content areas (clothing, food, animals, furniture, transportation) and chosen because examples of this content are familiar to children of all socio-economic backgrounds and because they are readily available as real or miniature three-dimensional objects.

By beginning with a few examples of each content area and gradually expanding to include more members of the class, it was possible to develop a variety of games and activities, each of which is one step beyond the previous one and each of which incorporates the experiences and knowledge acquired by the child. Each of the five areas is sequenced in such a way that it is revisited and repeated in a variety of ways. Each time, however, the game or activity becomes less concrete and more abstract. The real orange, for example, is replaced by a picture of an orange as the only stimulus, and finally, the games are highly verbal and require statements about an orange. Every game or activity engages the child in some kind of active interplay of manipulation, perception, and verbalization.

This gradual transformation of overt action into mental operations is a direct consequence of Piaget's key tenet that stable and enduring cognitions about the world come about only through a very active commerce with this world on the part of the knower (Flavell, 1963, p. 367).

It should be pointed out, however, that the goals of the program go beyond competence in manipulating language. The program gives the

child an opportunity for the development of strategies of gathering information, problem-solving, and decision making. The skills and concepts children acquire are as follows:

1. Information gathering and processing through the use of all the senses
2. Observation, identification, and labeling of objects
3. Attention to and concentration on attributes that discriminate one object from another (what makes a pear a pear)
4. Classification
5. Identification of classes and sub-classes
6. Identification and classification on the basis of reduced clues
7. Encouragement by the use of guesses and hunches
8. Decision making
9. Use of past learning to make decisions
10. Problem solving
11. Reasoning by association, classification, and inference
12. Anticipation of events and circumstances
13. Expression of ideas
14. Imagination and creativity
15. Conventional (in contrast to idiosyncratic) communication
16. Operations on relationships
17. Exploration of numbers and space

It can be seen that while the program exposes children to experiences that will gently nudge them along in their development, it also equips them with tools and techniques which enable them to learn how to learn.

The emphasis on creative exploration is in vivid contrast to Montessori programs which restrict the child to classification and description of the world around him. An important advantage of the Learning to Learn approach is that it makes the child more independent since his past experiences help him master new situations. His greater maturity is evident in his increasing reliance upon his own resources and decreasing dependence on the teacher. He experiences tremendous satisfaction from the knowledge that he knows how to solve problems and to grow independently.

Two teachers, as well as two classroom areas, are necessary. One room is large enough to accommodate a class engaged in a variety of activities. A smaller room is used by one teacher for short sessions devoted to the planned sequential activities. Here the size of the group is limited to four children who are homogeneous with respect to level and rate of learning. The careful use of groups is in accord with Piaget's second major implication for education.

> "If social cooperation is thus one of the principal formative agents in the spontaneous genesis of child thought, it is an imperative necessity for modern education to make use of this fact by according an important place to socialized activities in the curriculum." (Aebli, 1951, p. 60)

Considerable emphasis is placed on the creation of a favorable learning atmosphere. The other children must show the learner (player) respect by being quiet so he can "think with his brain" (make observations, organize information and also his thoughts before responding). With such an emphasis it soon becomes apparent to the child that he is important and that what he is trying to achieve is worthwhile.

The Curriculum of the Program

I. Language and Communication

A. The following activities are designed to help the child learn ways to gather, relate, organize and apply information in a meaningful and useful manner. This includes the use of senses to gather information.

1. Visual

a. Observation of and attention to shape, color, and distinguishing characteristics to identify item

b. Observation of and attention to similarities and differences of shape, color, and distinguishing characteristics to differentiate between items

c. Observation of and attention to shape, color, and distinguishing characteristics to identify identical items

d. Observation of and attention to shape, color, and distinguishing characteristics to locate and identify item in an array

e. Observation of and attention to parts and position of parts of an item to form a whole item

f. Identification of item by observation and attention to partial visual clues (shape without color, partial shape with color, partial shape without color)

2. Auditory

a. Listening to and concentrating on verbal description to identify item

b. Associating verbal description with visual model to identify item

c. Listening to and concentrating on stories to find facts

d. Listening to and concentrating on stories to anticipate outcome

e. Listening to and concentrating on verbal directions to understand nature of a problem and how to complete task

f. Listening to and concentrating on words to discriminate between sounds

3. Organization

a. Labeling

(1) Learn to associate name with item having specific attributes (shape, color)

(2) Learn to associate name with picture of item

(3) Learn to associate name with picture of item when some visual clues have been removed (shape without color, partial shape with color, partial shape without color)

(4) Learn names of categories

(5) Learn to associate groups of items with category name

4. Classification

a. Learn that items can be arranged into categories by some type of system

b. Given the information, learn names of categories and items belonging to each category

c. Given criteria of how items are categorized and description of how items meet criteria, separate items into categories

d. Recall information to separate array of items into 2, 3, 4, or 5 categories

e. Combine sub-categories into general categories using criteria of attributes and/or function

5. Part-Whole

a. Associate attributes of parts to whole item

b. Arrange parts to form whole

c. Breakdown whole into parts

6. Sequence

a. Anticipate and describe events of a story from a storybook

b. From a story sequence of 2 pictures, choose an appropriate ending from a choice of 2 pictures

c. From a story sequence of 3 pictures, choose an appropriate ending of story from a choice of 2 pictures

d. From an array of seven/eight pictures, choose any number of pictures to make a story

7. Problem Solving

a. Past learning to make decisions

(1) Apply information to separate items into categories

(2) Given all parts, identify whole

(3) Given partial visual clues, identify item (shape without color, partial shape with color, partial shape without color)

(4) Make visual representation of item or items

(5) Using knowledge of story structure, sequence pictures and make up a story about them

(6) Make a series of decisions to complete a task

b. Hunches and guesses to make decision

(1) Identify item from incomplete clues

(2) Associate known items with unfamiliar items for general identification of category

B. The following activities are designed to help the child experience satisfaction in possessing knowledge and being able to use it for independent accomplishment.

1. Problem solving (see A-7 above)

a. Use past learning to make decisions

b. Use hunches and guesses to make decisions

2. Anticipation of events and circumstances

a. Apply knowledge of game procedure to new game

b. Anticipate other children's play during a game to block their play

c. Anticipate own next play and structure play for advantage

d. Anticpate and describe events of a story

C. The following activities are designed to help the child learn to communicate knowledge and ideas verbally.

1. Description

a. Apply name to item

b. Apply name to category

c. Apply learned descriptive vocabulary to describe items

d. Tell uses to describe item

e. Compare and contrast attributes of items

2. Discussion

a. Associate own experience to items and relate experiences to group

b. Apply knowledge to tell reasons for guesses and decisions

c. Answer questions

3. Story telling

a. Describe elements of pictures containing action

b. Express ideas concerning action of a picture

c. Use sentences rather than 1 or 2 words to express ideas

d. Relate action in a sequenced series of pictures to make a story

e. Elaborate on action of a picture, giving events before and after, describing emotions of characters, giving dialogue to characters

f. Elaborate on action of sequenced pictures giving story details

g. Choose a series of pictures, sequence them, and tell a story about them

II. Numbers and Space - Sequential activities for learning mathematical concepts.

A. Games in this group are designed to develop the child's concept of spatial relationships through kinesthetic and spatial cues.

Games and Activities	Objectives
Obstacle Course	To develop the child's awareness of his own body in relation to an object.
Chairs	To develop the child's ability to use kinesthetic and temporal cues in making spatial judgments.
Road Game I	To provide practice in using kinesthetic and temporal cues as an aid to spatial estimation.

Road Game II	To develop the child's ability to use visual cues and previous experience to make fine discriminations of spatial relationships (no kinesthetic cues).

B. Games in this group use colored sticks to develop the child's ability to classify by color, size, and sequence, and to develop the concepts of equivalence, spatial relationships, and estimation.

Activity I - Identifying Colors	To develop the child's ability to identify colors of sticks.
Activity 2 - Free Play	To encourage independent discoveries about the characteristics of the sticks by manipulating them during free play.
Activity 3 - Classification by Color	To develop the child's ability to classify by color.
Activity 4 - Fence	To develop the child's ability to classify by color and size.
Activity 5 - Touch	To develop the child's ability to use the sense of touch to discriminate differences in size.
Activity 6 - Ordinal Position I	To develop the child's ability to construct a sequence by size. To introduce the words <u>first</u>, <u>second</u>, <u>third</u>, <u>fourth</u>, <u>fifth</u>.
Activity 7 - Ordinal Position II	To develop the child's ability to construct a sequence by size and color. To review the words <u>first</u>, <u>second</u>, <u>third</u>, <u>fourth</u>, <u>fifth</u>.
Activity 8 - Stairway	To develop the child's ability to construct a sequence by size and color.
Activity 9 - Guess	To provide experience with size sequence.
Activity 10 - Paper Bag	To develop the child's ability to use the sense of touch to discriminate slight differences in size.

Activity 11 - Replacement	To develop the concepts that (1) length may be composed of different parts and (2) length remains the same regardless of the arrangement of its parts.
Activity 12 - Blocks	To reinforce the concepts that (1) length may be composed of different parts and (2) length remains the same regardless of the arrangement of its parts.
Squares Game (Playing the Game)	To determine the degree of the child's understanding of the concept that length may be composed of different parts.
(Later-Play Activities)	To reinforce the concept presented in the Squares Game by imposing more demanding rules for stick replacement and by using white sticks for replacement.
Equivalence (Playing the Game)	To extend the concepts that (1) length may be composed of different parts and (2) length remains the same regardless of the arrangements of its parts.
(Later-Play Activities)	To reinforce the concepts of the Equivalence Game by using white sticks.
Estimation I (Playing the Game)	To develop the child's ability to use visual cues to estimate spatial relationships. To extend the concepts that (1) length may be composed of different parts and (2) length remains the same regardless of the arrangement of its parts.
(Later-Play Activities)	To reinforce the concepts of the Estimation Game by using white sticks.
House Game (Lead-in Activities)	To review possible stick combinations that can be used to make a given length. To familiarize the child with the House Game playing board.
(Playing the Game)	To develop the concept that length is composed of shorter lengths added together.

(Later-Play Activities)	To reinforce the concept of the House Game by imposing more demanding rules for stick replacement and by using white sticks for replacement.
Steps Game (Lead-in Activities)	To review sequencing by size and color. To familiarize the child with the Steps Game playing board.
(Playing the Game)	To extend the child's ability to construct a sequence according to size and color. To provide practice in performing additive operations.
(Later-Play Activities)	To reinforce the concepts of the Steps Game by removing color cues.

C. Games in this group are designed to develop the child's ability to recognize, seriate, and write the numerals 1 through 9.

One to Three Game Version 1	To reinforce the child's recognition of the numerals 1 through 3.
Version 2	To develop the concept that the numerals 1, 2, 3 represent sets of objects.
(Later-Play Activities)	To reinforce the concept that the numerals 1, 2, 3 represent sets of objects.
One to Six Game Version 1	To reinforce the child's recognition of the numerals 1 through 6.
Version 2	To develop the concept that the numerals 1 through 6 represent sets of objects.
(Later-Play Activities)	To reinforce the concept that the numerals 1 through 6 represent sets of objects.
One to Nine Game Version 1	To reinforce the child's recognition of the numerals 4 through 9.
Version 2	To develop the concept that the numerals 1 through 9 represent sets of objects.

(Later-Play Activities)	To reinforce the concept that the numerals 1 through 9 represent sets of objects.

D. Games in this group are an extension of the games in previous groups and deal with more abstract mathematical concepts.

Plus and Minus Signs	To familiarize the children with the plus and minus signs.
Buy and Sell Game 1 (Lead-in Activities)	To develop the concepts of addition and subtraction. To develop an understanding of the record-keeping function of numerals. To develop the ability to classify according to family.
Buy and Sell Game 1 (Playing the Game)	To reinforce the concepts taught in the lead-in activities.
Buy and Sell Game II (Lead-in Activities)	To extend the concepts of addition and subtraction. To reinforce the child's understanding of the record-keeping functions of numerals To reinforce the child's ability to classify according to family. To introduc mathematical sentences.
(Playing the Game)	To reinforce the concepts taught in the lead-in activities.
Animal Toss Game (Lead-in Activities)	To familiarize the child with the animals used in the game. To develop the child's understanding of the concepts "more than" and "less than." To provide experiences in counting.
(Playing the Game)	To extend the concepts "more than" and "less than." To develop the child's understanding of the terms <u>plus</u>, <u>minus</u>, and <u>equals</u>.
Land and Water Animals Game (Lead-in Activities)	To familiarize the children with the game board and playing cards used in the game. To provide experiences in counting. To provide experiences in classification by family.

(Playing the Game)	To develop the concepts "more than" and "less than." To extend the child's ability to classify by family.
Theater Tickets Games I and II (Lead-in Activities)	To introduce the concept of multiple-class membership. To reinforce the concepts of "more than" and "less than." To provide practice in performing the operations of addition and subtraction.
(Playing the Game)	To extend the concepts introduced in the lead-in activities.
Estimation II	To extend the concepts that (1) any length is composed of shorter lengths added together and (2) the terms more than and less than describe relationships. To extend the child's ability to make accurate spatial judgments. To develop the child's ability to solve problems involving logical relationships.
Estimation III (Playing the Game)	To develop the child's ability to apply the previously learned concepts that (1) any length is composed of shorter lengths added together, (2) the terms more than and less than describe relationships, and (3) there are specific relationships between the lengths of the colored sticks. To extend the child's ability to make accurate spatial judgments.
(Later-Play Activities)	To further extend the child's ability to make accurate spatial judgments by removing color cues.
The Two Game The Three Game The Four Game The Five Game	To develop insights into the nature of equivalence.
(Later-Play Activity)	To determine the extent of transfer of learning from the Two, Three, Four, and Five Games.

Other Aspects of the Learning to Learn Program

(1) In this approach to learning, the teachers are child oriented rather than subject matter oriented. They spend less time talking and more time making keen and sensitive observations about the child's rate and level of learning. Their major purpose is to pose problems for the children, ask questions, and stimulate interest and curiosity. The role of the teacher is to get the children to become active in the learning process and to make their own discoveries, formulate their own questions, and learn from their own activities, observations, and formulations. The teacher, therefore, must be perceptive and sensitive to the way in which each particular child works with and uses the materials.

(2) In this program the children are given the opportunity to develop strategies for gathering information, problem solving, and decision making. The acquisition of these skills provides them with a basis for confident, independent learning. The teacher creates an atmosphere where she is a source of stimulation, but where the children are given the major share of the work in the learning process. With such an approach each child gets continuous feedback that he can trust himself and his abilities. At the same time he becomes aware of his limitations in a non-threatening atmosphere.

(3) In the beginning children are homogeneously grouped and the teacher takes four children at a time to the smaller classroom to engage in a planned sequential learning activity. The larger classroom is divided into four activity areas. Each area contains a supply of games and activities which either reinforce, extend, or expand upon what is taking place in the small groups. Children are free to move from one

activity to another. A teacher assistant is available to give the child just enough help to send him on his way. The children are free to work together or alone in their explorations of and experimentations with the games and activities.

The activities are designed to give the child a chance to see the goal for which he is striving. In the process of moving towards this goal, he receives feedback on his progress in that direction. Thus, his motivation and interest in learning remain high. The games and activities involve the child in thinking and reasoning by forcing him to draw upon past experiences and information to solve a problem or make a decision. This builds his self-confidence and makes him more independent. His greater maturity is evidenced by increased reliance upon his own resources and efforts and lessened dependence on other persons. He benefits by developing and strengthening achievement skills and by experiencing the satisfaction of independent accomplishment. (For an example, see the games used in the program, Inquisitive Games, by Sprigle, 1967).

(4) Monthly meetings with parents are held while the children are enrolled in this program. The discussions focus on areas of interest and concern to the parents and the teacher. Topics include expectations and aspirations of parents; child growth and development; creation of an optimal learning environment at home; and the curriculum and its objectives.

Meetings such as these where free discussions are encouraged--there are no lectures by the teacher--get parents interested and involved with

their child and the school. It promotes their understanding of the roles of the home and school and creates an atmosphere of mutual trust and respect on the part of parents and teacher. These meetings are held in the classroom throughout the year.

Report cards are replaced by individual bi-monthly conferences with parents at which time the child's strengths and weaknesses are discussed. The emphasis is on rate and level of learning, rather than on success or failure, as such.

The arrangement of parental involvement will be similar when the children are in the first and second grades. There will be monthly meetings in the classroom and the discussion will focus on the content outlined above. In addition, there will be individual conferences with the teacher every two or three months, at which time the child's progress will be discussed, plus the ways the school and parent may cooperate in furthering this progress. These individual conferences will replace report cards.

(5) Through the use of teacher assistants, the children will be able to move from one activity to another without the aid of the teacher. For example, the teacher assistant will be able to change tapes for a new group of children, supervise games and activities where needed, etc. Thus the teacher is freed to assume the new role described above.

Design of the Project

Specific Hypotheses

The specific hypotheses for the first year of the program were that group 4E would be superior to group 4C, and that group 5E would be superior to group 5C at the end of a nine month program in the following developmental characteristics:

(1) general intelligence

(2) perceptual motor skills

(3) ability to express ideas

(4) language comprehension

(5) verbal reasoning ability

(6) spatial abilities

(7) motor coordination

(8) concept formation

(9) creativity and imagination

(10) achievement motivation

(11) school readiness skills

(Items 9, 10, and 11 were to be measured for the five-year-olds only).

Population and Sample

The subjects for this project consisted of 44 four-year-old children and 42 five-year-old children. The children from each age level were divided into two groups matched on intelligence and perceptual-motor skills. In addition, socio-economic level and cultural background were controlled for homogeneity as well as possible from the available subjects.

The children from both groups were selected from homes in the same deprived neighborhood of Jacksonville, Florida. With a few exceptions, the parents were employed at an occupational level below white collar worker. To control for intelligence and perceptual-motor skills the children were matched on scores obtained on the Stanford-Binet Intelligence Scale and the Arthur Revision of Seguin Form Board in the summer of 1968. The five-year-olds were also matched as closely as possible in school readiness skills as measured by the School Readiness Screening Test and two subtests from the Illinois Test of Psycholinguistic Ability. These data are presented in Table 1 for the four-year-olds and Table 2 for the five-year-olds. The groups did not significantly differ on any of the measures. The test scores for each subject are given in Appendix A.

TABLE 1

Pre-Program Means, S.D.'s and *t*'s for the Learning to Learn Four-year-olds (4E) and their Controls (4C)

Measure	Group	Mean	S.D.	t_{4E-4C}
Stanford Binet	4E	87.65	11.86	-0.16
	4C	88.14	6.98	
Seguin	4E	75.78	28.18	1.01
	4C	66.38	32.23	

TABLE 2

Pre-Program Means, S.D.'s and t's for the Learning to Learn Five-year-olds (5E) and their Controls (5C)

Measure	Group	Mean	S.D.	t_{5E-5C}
Stanford Binet	5E	89.71	9.54	0.03
	5C	89.62	8.18	
ITPA Vocal Encoding	5E	9.33	2.75	-0.22
	5C	9.57	3.89	
ITPA Auditory-Vocal Assoc.	5E	8.24	2.51	0.19
	5C	8.05	3.64	
SRST	5E	10.57	3.58	0.31
	5C	10.24	3.19	
Seguin (time score)	5E	49.05	18.61	0.75
	5C	44.67	18.39	

Group 4E consisted of 23 children who were exposed to the Learning to Learn Program from September, 1968 through May, 1969. These children have been exposed to one school year of the Learning to Learn Program and will have two years of planned sequential preschool experience before continuing the program in the first grade.

Group 4C was the control group for the four-year-olds. These children were in Head Start Centers in the first year of the project and will enter neighborhood kindergarten classes in the second year of the project.

Group 5E consisted of 21 children who were exposed to a one year planned sequential preschool program at the Learning to Learn School.

These children had a one year preschool program before entering the first grade where they will continue in the Learning to Learn first grade program.

Group 5C was the control group for the five-year-olds. They were selected from children entering a Title I kindergarten program in the same neighborhood from which the experimental subjects were drawn. During their kindergarten year they were taught by the "traditional" preschool methods used in the Title I programs in Jacksonville, Florida.

Instruments

The instruments used to measure the developmental characteristics of the children at the end of the first year in the program were as follows:

Developmental Characteristics	Instruments
1. General intelligence	Stanford-Binet Intelligence Scale, Form L-M (Terman and Merrill, 1960)
2. Perceptual-motor skills	Bender Motor Gestalt Test (Koppitz, 1964)
3. Ability to express ideas	The Illinois Test of Psycholinguistic Abilities (McCarthy and Kirk, 1961) Vocal Encoding subtest
4. Language comprehension	The Illinois Test of Psycholinguistic Abilities Visual Decoding subtest
5. Verbal reasoning ability	The Illinois Test of Psycholinguistic Abilities Auditory-Vocal Association subtest
6. Spatial abilities	Seguin Form Board-Arthur Revision (Arthur, 1947)
7. Motor coordination	Rail Walking Test

Developmental Characteristics	Instruments
8. Concept formation	The Illinois Test of Psycholinguistic Abilities The Visual-Motor Association subtest
9. Creativity and imagination	Ratings of pictures and stories made by children (five-year-olds only)
10. Achievement motivation	Ratings by teachers (five-year-olds only)
11. School readiness skills	School Readiness Screening Test (Sprigle, 1966) (five-year-olds only)

Procedure

During the months of May and June, 1968, the subjects were identified through the school systems in the poverty areas, through contact with churches in the poverty area, and by public announcements inviting parents who met the criteria to apply for enrollment in the program. The assistance of the welfare department and pediatricians in the community was also used to identify eligible families. The initial testing and screening of subjects was conducted during the summer of 1968 at the Learning to Learn School in Jacksonville, Florida.

During the 1968-69 school year the four- and five-year-old experimental children were exposed to the Learning to Learn curriculum. This curriculum has been fully developed. (See section on curriculum). The long range plans call for these children to continue in the sequential program through the second grade.

In this demonstration program classes for the five-year-olds met during a 3½ hour morning session and those for four-year-olds met for a 3½ hour session in the afternoon. The school year was consistent

with the public school calendar.

Each session was divided into two major blocks of time. The first hour and a half was devoted to exposing the children to a balance between formal learning activities and a work-play situation in which the child chose his own activities. During this block of time each child had approximately one half hour of formal learning in a "game atmosphere" and one hour of free choice activity.

The second half of each session, after a snack and a short rest period, was spent engaging the children in activities that involve both large and small body movements. These activities were also carefully planned and had a definite learning function.

The experimental group of children will remain together throughout the three or four year program. Since individual differences in rate and level of learning are major considerations, the teacher of these first grade children received first hand information on the strengths and weaknesses of each child (as well as the kindergarten teacher's progress report). To insure individual continuity of learning for each child, the person who will be their teacher when they are in first and second grades worked along with the teacher of these children for several weeks during their schooling as five-year-olds. These children will be continued in the program at the Learning to Learn School through the first and second grades. The first grade curriculum has been developed and tested with the kindergarten curriculum.

The control group of four-year-old children attended neighborhood Head Start day care centers throughout the school year. The control

group of children at the kindergarten level were exposed to a traditional kindergarten program. They attended a program consisting of group and individual activities designed to expose the children to a large variety of stimulation, concepts, and ideas. The program emphasized self-help, socialization, and sensory-motor and language experience. These activities, however, were not based on the developmental sequential program designed to teach children how to learn.

In the spring of 1969, following the completion of the major parts of the training programs, all subjects were evaluated with the developmental instruments. The examiners consisted of a research team from the University of Florida.

The test material has been checked and the scores retabulated by the director or co-director of the evaluation study to insure that scoring, administration, and test evaluation was done properly.

Results of the Study with the Four-Year-Old Children

Pre - Post Comparisons

The two groups of four-year-old children had been matched at the beginning of the school year on their performance on the Stanford Binet Intelligence Scale and the Seguin Form Board. A comparison of the scores of the two groups on these measures is presented in Table 3. This table indicates that the experimental group gained over 19 points on the Stanford Binet Scale during the school year while the control group had a mean Binet score about 2 points lower at the end of the school year. The gain for the experimental group is highly statistically significant while the loss for the control group did not reach statistical significance. On the Seguin Form Board both groups improved their time score significantly; however, the experimental group made considerably greater improvement on this measure also.

TABLE 3

Means, Standard Error of the Differences, and Matched t Ratios on Measures taken at the beginning and at the end of the Four-Year-Old Program

Measure	Group	Mean 1 (Pre)	Mean 2 (Post)	SED	t
Stanford Binet	4E	87.65	107.26	2.44	8.02**
	4C	88.14	86.10	1.85	-1.11 NS
Seguin (time score)	4E	75.78	29.65	5.23	-8.83**
	4C	66.38	49.24	6.84	-2.51**

$N_{4E} = 23$ $\quad *t_{.95} = 1.69$

$N_{4C} = 21$ $\quad **t_{.99} = 2.45$

NS = Not statistically significant

Comparisons between the groups at the end of the year

The means, standard deviations, and t values between the experimental and control groups on all measures taken at the end of the school year are presented in Table 4. On seven of the eight measures the Learning to Learn children scored significantly higher than the children of the control group. The one measure on which the difference is not significant is the Rail Walking Test, which is designed to measure gross motor coordination. The most striking difference between the two groups occurs on the Stanford Binet Intelligence Scale where the two groups differ at the end of the year by more than 20 points.

TABLE 4

The Means, Standard Deviations, and t Ratios on Measures taken at the end of the Four-Year-Old Program

Measure	Group	Mean	S.D.	t_{A-B}
Stanford Binet	4E	107.26	9.93	
	4C	86.10	9.37	7.09**
ITPA	4E	11.96	2.84	
Vocal Encoding	4C	7.81	3.49	4.24**
ITPA	4E	7.96	3.48	
Visual Decoding	4C	4.52	3.61	3.14**
ITPA	4E	10.52	4.08	
Auditory-Vocal Assoc.	4C	5.19	3.81	3.54**
ITPA	4E	13.00	3.40	
Visual-Motor Assoc.	4C	8.14	4.85	3.78**
Seguin	4E	29.65	8.21	
(time score)	4C	49.24	25.58	-3.40**
Bender Gestalt	4E	16.48	3.69	
(error score)	4C	21.05	5.26	-3.28**
Rail Walking	4E	6.91	3.76	
(error score)	4C	6.71	3.74	0.17 NS

$N_{4E} = 23$

$N_{4C} = 21$

$*t_{.95} = 1.69$

$**t_{.99} = 2.45$

NS = Not statistically significant

Results of the Study with Five-Year-Old Children

Pre - Post Comparisons

The experimental and control groups were compared at the beginning and end of the kindergarten year on five measures. The pre and post scores of these measures and the t score comparisons between them are presented in Table 5. Changes in scores over the school year indicate that both groups made very significant progress. On the Stanford Binet, which is the only measure that takes into account the age change over the year, the experimental group made a highly significant gain. Although the control group scored slightly lower at the end of the program than at the beginning the difference was not statistically significant. On the other four variables which are all raw score measures both groups made significant advances over the school year.

TABLE 5

Pre- and Post-Program Scores for the Experimental and Control Five-Year-Old Children

Measure	Group	Mean 1 (Pre)	Mean 2 (Post)	SED	t
Stanford Binet	SE	89.71	98.81	1.47	6.27**
	SC	89.62	87.95	2.33	-0.71NS
ITPA Vocal Encoding	SE	9.33	12.71	0.99	3.41**
	SC	9.57	13.10	0.84	4.20**
ITPA Auditory-Vocal Assoc.	SE	8.24	15.76	0.70	10.82**
	SC	8.05	13.05	0.49	10.25**
SRST	SE	10.57	19.19	0.82	10.54**
	SC	10.24	16.05	0.65	6.94**
Seguin (time score)	SE	49.05	23.81	3.77	6.70**
	SC	44.67	24.29	3.37	6.05**

$N_{SE} = 21$ $N_{SC} = 21$ $*t_{.95} = 1.69$ $**t_{.99} = 2.45$ NS = Not statistically significant

Comparisons between the groups at the end of the year

Table 6 shows the comparisons between the experimental and control groups on all measures taken at the end of the school year. On nine of the 23 comparisons the experimental group scored significantly higher than the controls. On the six ratings made by the teachers none of the comparisons reach statistical significance at the .05 level. It is important to point out here that the teachers of both the experimental and control groups rated all their children fairly high on the scale used. A copy of the rating scale is presented in Appendix B.

The measure on which the experimental children excelled are primarily those involving abstract reasoning ability and creativity as measured by the analysis of the children's stories. Group 5E also did much better on the Bender Gestalt test designed to measure perceptual-motor skills.

TABLE 6

The Means, Standard Deviations and t Ratios on Measures taken at the end of the Five-Year-Old Program

Measure	Group	Mean	S.D.	t_{5E-5C}
Stanford Binet	5E	98.81	10.93	
	5C	87.95	12.56	2.92**
ITPA	5E	12.71	3.44	
Vocal Encoding	5C	13.10	3.53	-0.35 NS
ITPA	5E	11.38	2.70	
Visual Decoding	5C	10.43	3.02	1.05 NS
ITPA	5E	15.76	3.58	
Auditory-Vocal Assoc.	5C	13.05	3.29	2.50**
ITPA	5E	15.24	3.05	
Visual Motor Assoc.	5C	13.29	2.60	2.18**

TABLE 6 con't

Measure	Group	Mean	S.D.	t_{5E-5C}
SRST	5E	19.19	4.70	
	5C	16.05	4.26	2.22*
Seguin	5E	23.81	4.76	
(time score)	5C	24.29	5.75	-0.29 NS
Bender Gestalt	5E	12.00	2.82	
(error score)	5C	16.48	4.90	-3.54**
Rail Walking	5E	4.19	3.17	
(error score)	5C	5.95	4.11	-1.52 NS
Teacher Rating	5E	3.29	0.76	
Effort	5C	2.81	1.05	1.64 NS
Teacher Rating	5E	2.86	0.83	
Persistence	5C	2.67	1.17	0.59 NS
Teacher Rating	5E	2.95	0.90	
Goal Directedness	5C	2.57	1.00	1.26 NS
Teacher Rating	5E	2.81	0.73	
Independence	5C	2.52	0.96	1.06 NS
Teacher Rating	5E	2.57	0.66	
Fear of Failure	5C	2.29	0.98	1.08 NS
Teacher Rating	5E	14.48	3.02	
Total	5C	12.86	4.59	1.32 NS
Stories	5E	44.05	20.99	
No. of Words	5C	36.48	25.37	1.03 NS
Stories	5E	4.29	2.96	
No. of Adjectives	5C	3.14	3.08	1.20 NS
Stories	5E	4.43	3.02	
No. of Simple Verbs	5C	3.00	3.92	1.29 NS
Stories	5E	1.86	1.36	
No. of Complex Verbs	5C	1.71	2.21	0.25 NS
Stories	5E	7.97	3.83	
Mean Sentence Length	5C	5.77	2.72	2.09*
Stories	5E	3.81	1.30	
Creativity	5C	2.76	1.15	2.70**

TABLE 6 con't

Measure	Group	Mean	S.D.	t_{5E-5C}
Stories Abstraction	5E	3.86	1.21	
	5C	3.10	1.23	1.98*
Stories Language Quality	5E	3.52	1.22	
	5C	2.67	1.04	2.39*

$N_{5E} = 21$ $*t_{.95} = 1.69$

$N_{5C} = 21$ $**t_{.99} = 2.45$

NS = Not statistically significant

Since the stories are not a standardized test they warrant some explanation. Each child was individually given the W-5, I Wonder Card, from the Peabody Language Development Kit, Level II. He was asked to tell the best and most interesting story that he could. The stories were analyzed in terms of total number of words, total number of adjectives, total number of simple verbs, total number of complex verbs, mean sentence length, and each story was rated for creativity, abstraction, and language quality on the basis of a six point scale by two raters. A copy of the rating scale used is presented in Appendix C.

Comparison between the experimental and control groups based on further analysis of the stories

In an effort to try to gain more information about how the groups are similar and different with respect to their language ability, the stories were analyzed in some additional ways. Table 7 lists these

comparisons. These data are descriptive and were not subjected to statistical analysis, but are presented to give a more qualitative presentation of how the quality of the stories differed in the two groups. As can be seen from Table 7 the experimental group showed superior usage of language in that they told longer stories and used a greater variety of words. They used a lower percentage of nouns and a higher percentage of verbs in their stories, suggesting that they were more action oriented than descriptively oriented.

TABLE 7

Analysis of Language used in the Stories for Groups 5E and 5C

	Experimental Group	Control Group
Number of different words used	151	130
Number of words used by both groups	79	79
Number of words used exclusively by each group	72	51
Characteristics of exclusive group		
Number of nouns	22	24
Percentage of total number of words	31%	47%
Number of verbs	32	15
Percentage of total number of words	44%	29%

Comparisons of pre - post Binet changes within the experimental five-year-old groups

In order to try to determine some characteristics of the children within the experimental group who made the most or least progress, the children were divided into two groups based on certain demographic characteristics. These are descriptive data only. These data are presented to show trends and some possible hypotheses for future research.

Table 8 shows the pre- and post-Binet scores for those children who come from families with 0 to 3 siblings as compared to those having 4 to 7 siblings. These data show that the children coming from larger families had lower pre-program scores, but gained a small amount more during the year than the children who came from small families.

TABLE 8

Pre- and Post-Binet Scores for Kindergarten Children from Large and Small Families

Number of Siblings	Binet Pre	Binet Post	N	No. of Points Change
Four - Seven siblings	88.2	97.8	9	9.5
Zero - Three siblings	90.8	99.6	12	8.7

Table 9 shows the pre- and post-Binet score comparisons between the children whose mothers had a high school education as compared to those who had not completed high school. These data suggest that the children

of mothers with a high school education begin at about five points higher on the Binet. The children whose mothers have the least education, however, gained more than the other group during the Learning to Learn Program.

TABLE 9

Pre- and Post-Binet Scores for Children with Mothers who have or do not have a High School Education

Level of Mother's Education	Binet Pre	Binet Post	N	No. of Points Change
High School Education	92.2	99.9	10	7.7
Less than High School Education	87.0	97.6	11	10.6

These data are very tentative and could only be obtained on the experimental group; therefore, no definitive conclusions can be drawn from them. It is interesting to note, however, the trends which seem to suggest that children who come from the least advantaged homes gain the most from the program.

Discussion

The results of this study indicate that the children who participated in the Learning to Learn Program made significantly greater developmental gains over the school year than those who participated in "traditional" programs.

Somewhat surprising were the extremely large gains made by the four-year-old experimental group compared to the moderate gains made by the five-year-old experimental group. Following are some possible explanations for the differential development between the two groups. First, the age of four may be a more critical period for compensating for the developmental lag which presumably has resulted from cultural deprivation. By the age of five, the children may be less able to compensate for this disadvantage; as well as having had an additional year with a lack of systematic developmental stimulation. Second, two of the five-year-old children were extremely difficult to work with and are believed to be suffering from rather severe psychological disturbances. One of the five-year-old children still did not talk or say any words by the end of the five-year-old program, although she did participate in and learn from the non-verbal aspects of the program. It did not appear that there were any children as disturbed in the control group; nor did any of the four-year-old children have this degree of psychological disturbance. Thus the two disturbed children who were also slow in learning accounted for some of the difference between the groups.

It is difficult to run an experimental preschool program and meet all of the factors that go into making a good experimental design. In this study it was impossible to have the control groups in the same classrooms as the Learning to Learn children. Also teachers and aides were different. On the basis of our observations, however, it appeared that the teachers for both the experimental and control groups were well motivated and competent people. The amount of time spent in the programs was the same. The initial testing was done with the testers being unaware of the group the child would enter. Since the children were in different locations this could not be done at the end of the program; however, all the testing was done by an independent team of researchers. From the observations made by the evaluation team the overall involvement and concern of the staff at the Learning to Learn School was somewhat greater than with the control groups. This may have accounted for a small amount of the difference between the groups. Although the staff for the control groups appeared to be well motivated they often did not put extra effort into after hours kinds of activities as sometimes occurred in the Learning to Learn School. How much of a factor this would be in the development of children is difficult to determine.

One of the most significant aims of this program is to determine the effects of exposing groups of culturally deprived children to different lengths of specialized programs. It is planned that the four-year-old group will remain in the Learning to Learn Program for four consecutive years and the five-year-old group for three consecutive years. It is hoped that we will be able to follow these children after

they leave the experimental programs to determine if this amount of exposure to a special program will allow them to maintain their level of growth as they proceed through neighborhood schools. The plan is to place the experimental group in middle class schools, as opposed to ghetto schools. This is important because the results of our previous research with another group of children who had a one year kindergarten Learning to Learn program and then went into neighborhood ghetto schools indicate that they lost most of their developmental gains during the first three grades. These children were evaluated at the end of each school year. Although they were able to maintain most of their advantage through the first grade their rate of intellectual development dropped some each year and by the end of the third grade few significant differences existed between the children from the original experimental program and a matched control group. It is hoped that by placing the current experimental group of children in middle class schools this decrement can be avoided. Some comparisons might then be made with the previous group who went into neighborhood ghetto schools.

It is hoped that this project will answer some questions about the effects of different lengths of special training programs on the long term development of culturally disadvantaged children.

Conclusions from this Study

Since this is only the first year of a four year project conclusions are necessarily limited; however, there is evidence from this study to support the following conclusions:

1. The four-year-old culturally deprived children who attended a Learning to Learn program made significantly greater progress during the school year than a matched control group who attended Head Start Day Care Centers.

2. The five-year-old culturally deprived children who attended the Learning to Learn Program made significantly greater progress during the school year than the matched control group that attended a "traditionally" run kindergarten program.

3. The four-year-old Learning to Learn group made comparatively greater progress during the school year than the five-year-old Learning to Learn group.

Summary

This is a report on the first year of a proposed four year study. Two groups of four- and five-year-olds were matched on several developmental variables and one group at each age level entered the Learning to Learn Program. The other group entered a "traditionally" run preschool program and served as a control group. The long range plans call for the two experimental groups to remain in the Learning to Learn Program through the second grade. Comparisons will be made with the control groups which will remain in "traditionally" run programs.

Results from the present study indicate that the four-year-old Learning to Learn children have made much larger developmental gains than the control group. The five-year-old experimental group has also advanced more rapidly than their control group; however, the gains were not as great as with the four-year-olds.

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Appendix A
Kindergarten - Spring, 1969
Group A - Experimental

Subject No.	Binet		ITPA						SRST		Seguin		Bender
	Pre	Post	Pre V.E.	Post V.E.	Pre V.D.	Pre A.V.	Post A.V.	Post V.M.	Pre	Post	Pre	Post	
1.	91	102	9	13	14	8	22	16	14	21	32	20	14
2.	98	120	11	19	10	9	19	15	14	21	44	24	13
3.	96	106	10	14	12	11	21	16	14	23	34	17	11
4.	105	117	9	9	8	14	20	7	13	20	44	29	7
5.	82	91	7	11	14	7	12	12	9	14	49	29	8
6.	82	86	13	20	11	7	14	19	6	15	41	28	14
7.	105	123	10	7	9	11	18	19	15	18	33	20	9
8.	68	86	14	17	12	6	13	18	8	15	78	23	10
9.	90	96	10	10	13	10	8	13	10	11	87	36	11
10.	78	100	10	9	14	6	14	13	9	19	53	20	14
11.	100	112	6	12	11	7	18	11	12	24	44	20	12
12.	84	91	10	11	7	4	12	14	7	14	85	26	10
13.	99	103	8	13	10	7	16	17	11	22	42	30	17
14.	98	104	10	12	16	11	17	15	13	28	33	19	10
15.	92	103	8	12	15	9	17	14	13	27	39	27	9
16.	89	100	13	18	7	12	18	16	12	20	41	21	12
17.	93	108	4	13	10	8	19	20	16	25	37	16	14
18.	79	79	9	12	12	6	10	19	9	12	45	23	17
19.	78	82	10	8	12	8	16	16	3	16	39	24	13
20.	84	91	9	19	13	4	13	13	9	16	59	24	16
21.	93	98	6	16	7	8	16	17	11	20	37	22	13

Appendix A
Kindergarten - Spring, 1959
Group A - Experimental

Subject No.	Rail Walking	Teacher's Rating Effort	Persist.	Goal	Indep.	Failure	Total
1.	0	2	2	3	2	2	11
2.	4	4	4	4	3	3	18
3.	1	4	4	3	3	3	17
4.	4	4	4	3	3	3	17
5.	10	4	2	1	2	2	11
6.	1	2	2	2	2	2	10
7.	1	4	4	4	4	4	20
8.	6	4	3	2	3	2	14
9.	5	2	2	3	2	2	11
10.	3	2	2	3	2	2	11
11.	9	3	3	4	3	3	16
12.	6	4	3	2	4	2	15
13.	3	3	3	3	3	3	15
14.	1	4	4	4	4	4	20
15.	0	3	2	3	2	3	13
16.	6	3	2	4	4	3	16
17.	3	3	4	4	3	3	17
18.	9	4	3	3	3	2	15
19.	2	4	2	3	2	2	13
20.	3	3	2	1	2	2	10
21.	9	3	3	3	3	2	14

Appendix A
Kindergarten - Spring, 1969
Group A - Experimental

Subject No.	STORIES Words	Adj.	Simp. Verbs	Comp. Verbs	Mean Sentences	Creativity	Abstract	Language Quality
1.	40	3	4	2	10.0	5	5	4
2.	53	9	5	1	3.8	3	5	3
3.	26	3	2	2	6.0	4	4	4
4.	103	10	13	2	14.7	4	5	5
5.	65	5	4	4	13.0	5	4	5
6.	39	3	3	3	13.0	5	4	3
7.	43	4	3	2	8.6	4	4	4
8.	53	4	5	4	10.6	5	5	4
9.	15	1	0	0	1.7	1	1	1
10.	27	1	1	0	3.0	2	2	2
11.	47	5	3	3	9.4	5	4	5
12.	2	0	1	0	1.0	1	1	1
13.	51	4	9	0	10.2	4	5	4
14.	44	7	5	2	8.3	4	4	4
15.	66	2	8	4	8.3	6	5	5
16.	63	7	8	3	12.6	3	5	5
17.	50	3	3	3	10.0	5	4	3
18.	33	5	5	1	8.3	4	4	4
19.	15	1	1	1	3.0	3	3	2
20.	46	11	5	0	6.6	3	3	3
21.	44	2	3	2	6.3	4	4	3

Appendix A
Kindergarten - Spring, 1969
Group B - Control

Subject No.	Binet		ITPA						SRST		Seguin		Bender
	Pre	Post	Pre V.E.	Post V.E.	V.D.	Pre A.V.	Post A.V.	V.M.	Pre	Post	Pre	Post	
1.	87	78	8	13	11	6	11	13	8	15	56	26	22
2.	97	93	19	11	10	12	19	15	8	19	27	18	3
3.	86	99	7	10	13	9	13	14	18	24	48	27	23
4.	98	98	11	11	15	10	13	19	11	15	42	23	18
5.	80	79	11	11	7	5	9	14	7	10	85	26	18
6.	88	60	9	11	12	7	11	10	8	15	34	28	21
7.	99	88	9	14	11	10	15	12	10	13	44	27	19
8.	77	78	5	7	13	5	12	13	11	14	45	20	14
9.	94	93	3	9	7	7	11	11	10	19	75	37	17
10.	79	91	8	13	6	6	12	17	7	10	44	20	16
11.	93	77	7	14	10	6	16	13	10	15	42	20	19
12.	97	96	16	15	13	13	16	17	16	23	24	18	15
13.	93	81	13	17	7	4	10	11	10	14	43	33	14
14.	98	92	13	22	10	14	14	9	10	13	28	23	15
15.	91	87	8	9	7	9	14	11	6	20	31	19	13
16.	103	111	13	18	15	14	20	18	16	24	24	16	9
17.	88	96	7	11	16	9	17	14	13	20	17	17	12
18.	98	110	14	19	6	13	14	13	12	18	30	22	22
19.	79	91	4	14	10	5	10	12	6	12	78	30	24
20.	82	86	8	13	8	5	11	12	9	12	66	26	13
21.	75	63	8	13	12	0	6	11	9	12	33	34	19

Appendix A
Kindergarten - Spring, 1969
Group B - Control

Subject No.	Rail Walking	Teacher's Rating: Effort	Persist.	Goal	Indep.	Failure	Total
1.	2	3	2	2	2	2	11
2.	1	4	4	4	4	3	19
3.	3	4	4	3	3	4	18
4.	7	1	1	1	1	1	5
5.	8	2	2	2	2	2	10
6.	4	3	3	2	3	3	14
7.	2	3	3	2	2	2	12
8.	18	3	3	3	3	2	14
9.	9	4	4	3	4	2	17
10.	3	1	1	1	1	1	5
11.	3	2	1	2	3	3	11
12.	8	4	4	4	4	3	19
13.	15	3	3	3	2	1	12
14.	7	4	4	4	3	3	18
15.	3	1	1	1	2	3	8
16.	5	4	4	4	3	3	18
17.	4	4	4	4	4	4	20
18.	5	2	2	2	2	3	11
19.	4	2	2	2	2	1	9
20.	8	3	3	3	2	1	12
21.	6	2	1	2	1	1	7

Appendix A
Kindergarten - Spring, 1969
Group B - Control

Subject No.	STORIES Words	Adj.	Simp. Verbs	Comp. Verbs	Mean Sentences	Creativity	Abstract	Language Quality
1.	108	10	7	8	7.2	4	5	4
2.	49	3	3	4	7.0	3	4	3
3.	35	2	4	2	7.0	4	5	4
4.	27	4	1	0	3.0	2	3	1
5.	32	5	1	0	2.7	2	3	2
6.	60	1	7	4	8.6	5	4	4
7.	95	8	17	0	9.5	4	4	4
8.	6	0	0	1	3.0	3	3	2
9.	23	2	2	2	5.9	2	3	3
10.	38	4	1	4	9.5	4	4	3
11.	23	2	3	0	3.8	3	3	2
12.	16	0	2	1	5.3	3	3	3
13.	47	11	8	0	5.9	2	3	3
14.	11	0	0	0	2.2	1	1	1
15.	32	1	1	2	8.0	3	3	3
16.	20	2	0	0	1.7	1	1	1
17.	29	1	2	1	9.7	4	5	4
18.	36	4	0	6	9.3	3	3	3
19.	17	2	3	0	2.1	1	1	2
20.	28	4	0	0	2.8	1	1	1
21.	24	0	1	1	7.0	3	3	3

Appendix A
Four-Year-Old - Spring, 1969
Group A - Experimental

Subject No.	Binet Pre	Binet Post	ITPA V.E.	ITPA V.D.	ITPA A.V.	ITPA V.M.	Seguin Pre	Seguin Post	Bender	Rail Walking
1.	101	96	16	7	16	17	41	27	15	3
2.	95	127	12	2	13	11	56	30	21	9
3.	86	114	16	10	11	18	105	28	18	7
4.	73	93	8	1	5	12	47	23	15	6
5.	73	94	11	8	9	10	123	50	15	3
6.	87	107	14	12	11	15	115	30	17	5
7.	86	105	12	9	10	12	46	26	11	18
8.	80	124	9	9	9	6	83	25	16	15
9.	105	128	13	14	17	18	103	24	16	6
10.	111	118	11	8	7	19	53	22	16	10
11.	97	105	14	11	12	10	44	21	18	7
12.	86	107	9	12	17	11	51	20	17	5
13.	97	105	8	9	11	11	43	23	13	9
14.	109	117	12	7	17	17	64	26	21	2
15.	80	95	14	7	4	9	47	30	12	8
16.	90	107	10	10	13	14	82	38	14	4
17.	73	100	10	9	5	13	79	23	18	1
18.	99	98	7	7	14	12	95	27	13	6
19.	82	111	11	8	12	15	58	31	19	8
20.	84	101	10	8	7	15	111	28	25	6
21.	77	105	17	12	12	14	130	47	23	7
22.	74	109	16	2	4	13	96	38	9	9
23.	71	101	15	1	6	7	71	45	17	5

Appendix A
Four-Year-Old - Spring, 1969
Group B - Control

Subject No.	Binet		ITPA				Seguin		Bender	Rail Walking
	Pre	Post	V.E.	V.D.	A.V.	V.M.	Pre	Post		
1.	80	77	7	0	1	9	171	49	22	13
2.	89	90	12	6	8	12	37	24	14	3
3.	90	103	14	6	5	9	72	50	20	11
4.	95	82	4	9	9	14	46	30	18	2
5.	101	88	6	6	11	14	32	31	21	7
6.	105	91	13	10	9	12	39	20	18	1
7.	95	93	8	3	4	8	57	40	21	6
8.	79	81	2	2	1	1	72	89	28	4
9.	92	93	10	3	8	1	68	54	30	10
10.	82	71	6	1	1	0	67	36	30	5
11.	93	92	7	2	9	1	47	25	17	7
12.	82	77	5	2	6	5	62	115	30	6
13.	84	75	4	2	4	1	85	58	17	5
14.	85	78	4	1	0	4	110	97	30	12
15.	84	93	9	1	4	9	105	55	20	5
16.	79	72	8	6	6	11	93	77	19	8
17.	89	94	13	12	8	10	26	26	15	1
18.	82	78	3	1	2	12	51	42	21	9
19.	90	105	12	12	13	15	43	27	14	6
20.	83	91	10	4	13	12	54	29	17	5
21.	92	84	7	6	8	11	57	60	20	13
22.										

Appendix B
TEACHER RATING SCALE

Directions: For items A through E, circle the number of the statement that best describes the child.

Child's name_____

School_____

Teacher_____

The child's behavior:

A. Ratings of effort:

1. The child almost never tries his best or puts his best effort to his activities.

2. The child puts some effort into his work but could try harder most of the time.

3. The child shows a lot of effort but on many occasions does not try as hard as he could.

4. He is a very hard worker and usually puts his best effort into an activity.

B. Ratings on persistence:

1. The child shows little persistence and stops very quickly when any activity presents a challenge.

2. The child shows some persistence but gives up after only a short attempt at solving a problem or working at an activity which is challenging.

3. The child is quite persistent and will stick to a task or challenge for some time but gives up more quickly than some children.

4. The child shows a great deal of persistence and when confronted with a challenge or a problem which he cannot easily solve will stick with trying for much longer than average.

C. Ratings on goal directedness:

1. The child rarely gives evidence of working toward a given goal or evaluating his activities and work.

2. There appears to be some direction in the child's activity with some goal in mind, but little interest or checking to see if the goal is being reached or worked toward.

3. The child, when working appears to have a goal definitely in mind, shows some indication of making observations about his activity and whether or not this is leading to the goal toward which he is working.

4. The child is very observant of what he does; he is usually conscientious of the goal toward which he is working and appears to evaluate, look at, and check out whether or not he is moving toward a given goal in the activity.

D. Independence of work:

1. The child rarely works things out on his own and quickly seeks the help of other people.

2. The child will work on his own but only on tasks that are not difficult and challenging. On these tasks he rather quickly seeks the help of someone else.

3. The child generally likes to try things on his own and work them out on his own but if they become somewhat difficult will seek out help or assistance from the teacher or another child.

4. The child shows a great deal of independence in his work, likes to try things on his own and tries to work out problems and activities without the help of others even when they become difficult.

E. Ratings on fear of failure:

1. The child becomes quite upset and shows little confidence in himself when confronted with failure or when he is unable to complete or satisfactorily work out a task.

2. The child shows a mild lack of confidence and becomes somewhat upset when confronted with failure or when he is unable to complete a task or do well.

3. The child is quite confident of his own abilities and only shows minor concerns of feelings of inadequacy when he fails to complete a task or feels he has not done well.

4. The child appears to be very confident of his abilities and is not upset when he fails at a task or is unable to complete the task.

Appendix C

CREATIVITY RATING CRITERIA

Creativity

1. No creative content; object naming, unelaborated description

2. Minimum creativity shown; 1 or 2 objects, actions, details added to the picture content

3. Some creativity shown; rudiments of a story - one sentence narrative, projection of what happened, or is going to happen (1 step in sequence only) (He is going to open it).

4. Definite creativity shown; meaning added to the picture content to make it a sequence of events showing some imagination and going beyond the stimulus content (two or more sequential steps to narrative)

5. A creative story; a fairly meaningful, coherent, story that has some degree of unusualness

6. A very creative story; a meaningful, coherent, imaginative story

Abstraction

1. Object naming

2. Simple description of picture beyond object naming (e.g. "a boy swimming)"

3. Mostly description but some inter-relating between characters and/or objects in the picture (The boy is swimming to the bo:t).

4. A narrative that integrates aspects within the picture and includes emotions and actions attributed to the characters (He got friendly with the whale). (He caught the fish).

5. A narrative that projects emotions and actions beyond the stimulus presented in the picture. (The baby turtle went and told his mama).

6. A narrative that interprets different aspects of the picture, is relevant to it, but goes well beyond the picture in content.

Language Quality

1. Very sparse quality; generalized, simple vocabulary. No descriptive terminology (Listing objects by most general terms)

2. Use of at least one descriptive adjective and one action word (verb); still very generalized (little fishes, two boys, some shells, swimming, going), mostly listing - not complete sentences.

3. Use of more explicit nouns (whale, ocean, jellyfish), not really vivid, basic action verbs (saw, fell, looked), generalized adjectives (one, some, another), mostly complete sentences. Descriptions.

4. Use of descriptive phrasing (turned upside down, went down through the water) explicit verbs (dive)

5. Vivid description, explicit nouns and adjectives that conjure up a specific picture (treasure chest, shark, dolphin), personalization of characters (Moby Dick, more than naming, use of dialogue between characters)

6. Excellent command of vivid vocabulary and grammar in describing objects and actions.

END

12-14-70